

## BUILDING BRIDGES TO HEALTHIER BRAINS: THE JOURNEY BELONGS TO THE GLOBAL COMMUNITY

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The XXI century has been dubbed "The Century of the Brain", with international collaborative efforts across the globe aiming at uncovering the mind's mysteries. Insights from these research initiatives will help improve our understanding of the human brain and consequently brain health.

For instance, we know that after stroke or brain lesion, the brain has an extraordinary capacity to rewire itself. This plastic capacity however quickly decreases over time if the brain is not continuously challenged. But rehabilitation is a long, very long process. Starting early, increasing therapy time, and keeping motivation high during months, even years, are key factors to maximize recovery.

Every time I see physical occupational therapists in action with their neurological patients, I am impressed by their professionalism and savoir-faire. They are attentive, multitasking, supportive and ingenuous, making the utmost of their available time and materials to the patient's benefit. Despite all this, recommended rehabilitation doses (45 minutes daily per active therapy) are rarely achieved (e.g., for physical therapy, only in 9% of the cases).

Good news is that big improvements are happening at different levels, helping to overcome this and other challenges. Technology is no longer a stumbling block: assistive devices, exoskeletons, virtual reality and brain implants are already on the market at varying levels of maturity. Medical education programs are far more multidisciplinary than ever before and practitioners today have an excellent sense of innovation. Brain awareness campaigns are rolled out on a regular basis across traditional and new media platforms, playing a key social role in educating around tops of sedentary lifestyle and other risk factors.

Interestingly, scientific knowledge is already being translated into industrial solutions with hundreds of companies proposing new treatments and technologies. Scientifically proven neuroscience techniques, such as motor imagery or mirror therapy, are fusing with cutting-edge neurotechnologies to help the brain rewire naturally. Here, virtual reality, motion capture, robotics and brain stimulation technologies represent a pillar upon to base a multimodal rehabilitation platform to ensure the continuum of care, from day zero after the injury to chronic care at home, for a wide range of neurological disorders. Such multidisciplinary approaches allow for enhanced multisensory therapy, stimulating most senses (vision, hearing, touch...) to activate all neural networks related with the motor or cognitive impaired functions being trained.

It is especially at home where keeping patients engaged in rehabilitation becomes more difficult. And it is precisely in the home where training based on therapeutic video games can motivate patients to continue rehabilitation and encourage inter-generational game sessions: what a wonderful use of technology, and inspiring family experience when a grandchild can help a grandparent with stroke rehabilitation by playing together!



Let's validate these technologies with high quality clinical trials, and then let's integrate them into clinical practice. In particular, in the US many physical and occupational therapists have received PhD degrees, which usually provide an intrinsic research perspective and a taste for continuous innovation. These specialists are already becoming pioneers in their fields, as they are in the constant search for elevating the outcome of their therapeutic activities. Patients will definitively benefit from this approach; as will families, therapists, clinicians and hospitals.

As a community of professionals, we need to work together to bring these solutions to patients. It is our responsibility to contribute to global conversations and initiatives that ensure healthier lives and reduce burdens across the board for future generations. From policy makers to patients, from clinicians to companies, from insurance agencies to media outlets, we can all together make a difference. It is just matter of believing into it.

